Multicolored Origami. Papercraft with arbitrary images.

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0. Foreword.

Greetings to all. As it is already clear from the title, this book is devoted to the creation of multi-color origami with arbitrary pictures from ordinary office paper. The main tool is my site **http://origamidreaming.com** (hereinafter referred to as a resource) to which I will refer. At the moment, summer 2021, my resource is completely free. I apologize in advance for some bugs, however, in general, the resource works quite stably.

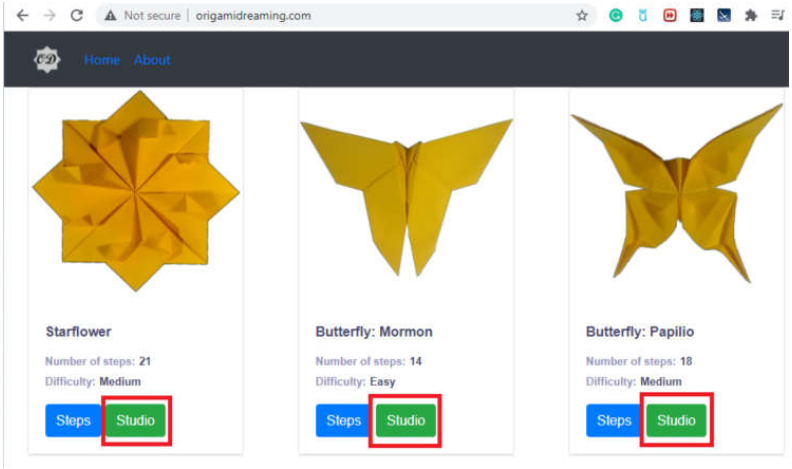
The target audience is quite large. Create some simple models, print and assemble with your kids. Perhaps you want to congratulate someone and make an original origami postcard. My resource can be useful, including for business, for example, you can create promotional items. Read on to find out how you can do this.

You will need - a laptop with a browser and a printer, with the ability to print in the "Borderless" mode, that is, without indents from the edge of the sheet.
At the moment, the resource is not optimized for mobile devices, so use a Windows desktop or Mac.

P.S I do not impose licensing requirements, therefore, you can use this book or any part of it at your own discretion.

1. How it works

So, in general, the algorithm for creating multicolor origami is simple:
1) Go to the home page http://origamidreaming.com (resource)
2) Select the appropriate model and click on the Studio button



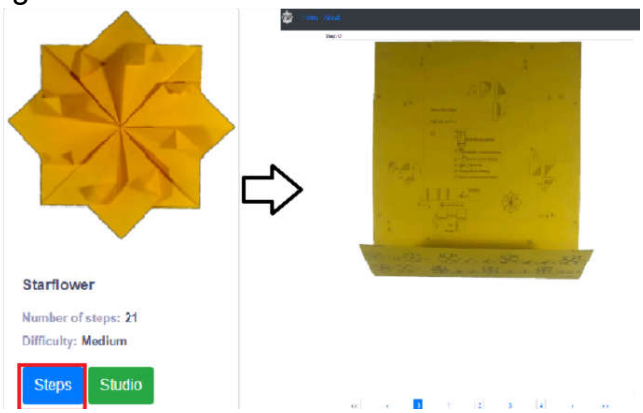
3) Produce design and print on a printer. (This item will be discussed in detail in the book)
4) Create your origami model from the printout.

Like here:

https://www.youtube.com/watch?v=UCbfbHB-89I

The first two points should be straightforward. The last point is worth mentioning briefly, so let's start with it. And the third point will be the rest of the book.

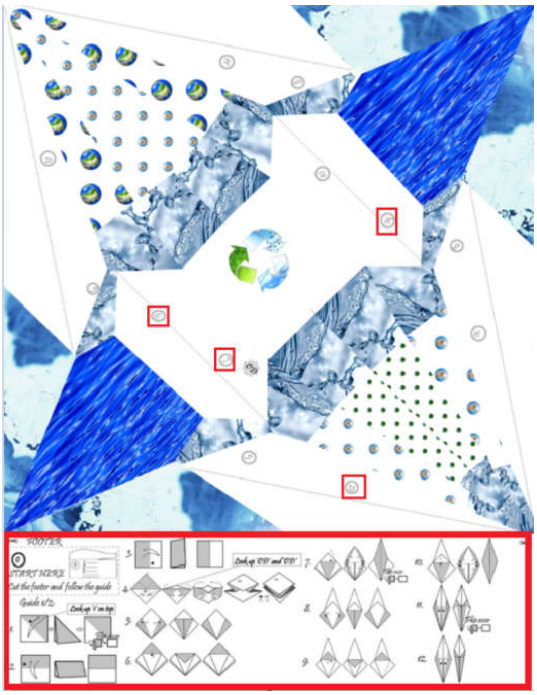
So, to create origami from a finished sheet, my resource is provided with two types of instructions (though not for all models):
A) Animations. Go to the home page http://origamidreaming.com and click the "Steps" button of the interacting model.



B) Regular printed instructions.

This is one of the features of the idea, when the instruction is given directly on the sheet from which the origami model is created. This instruction will not be visible on the finished product.

If the base should be a square, then the instruction will be given on the tear-off part, and on the main part there will be only numbers. To save ink in the printer, this function can be disabled, which will be discussed below.

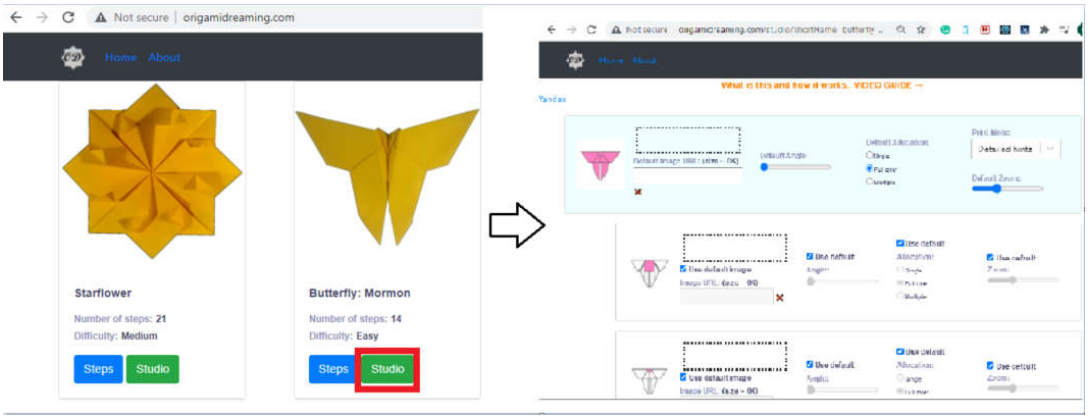


2. Studio. Model design

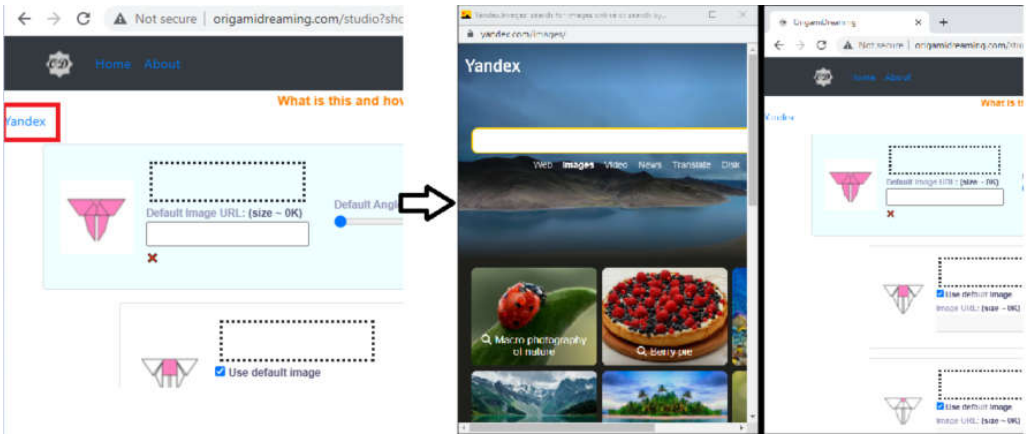
2.1 A step-by-step guide to a simple design

In general, this is done like this:

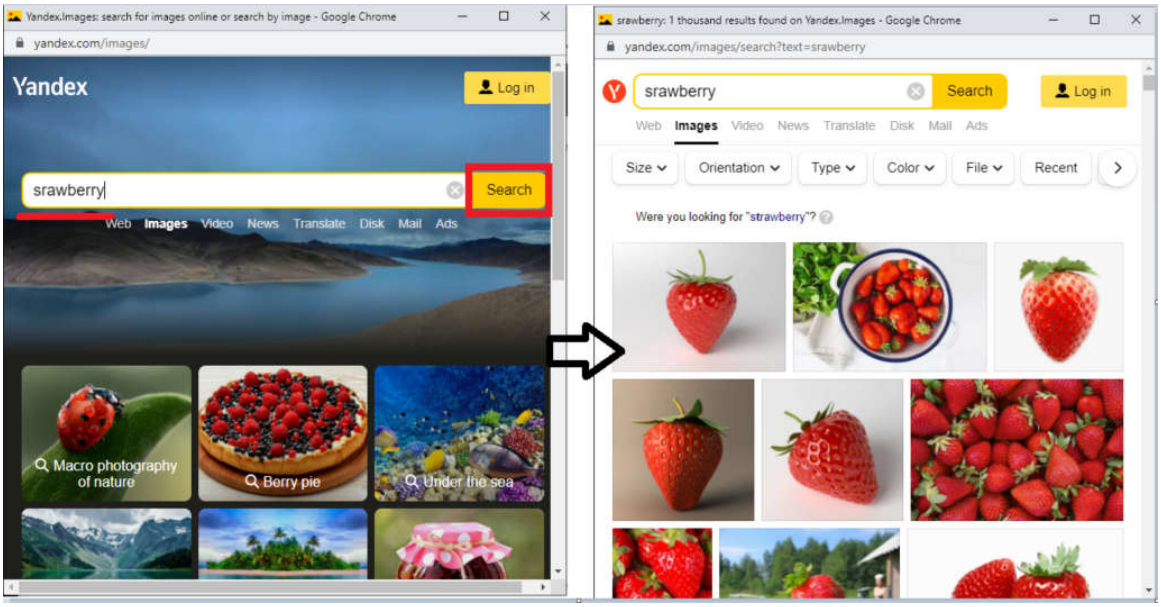
A) From home page http://origamidreaming.com press the button "Studio" of the origami model you like.



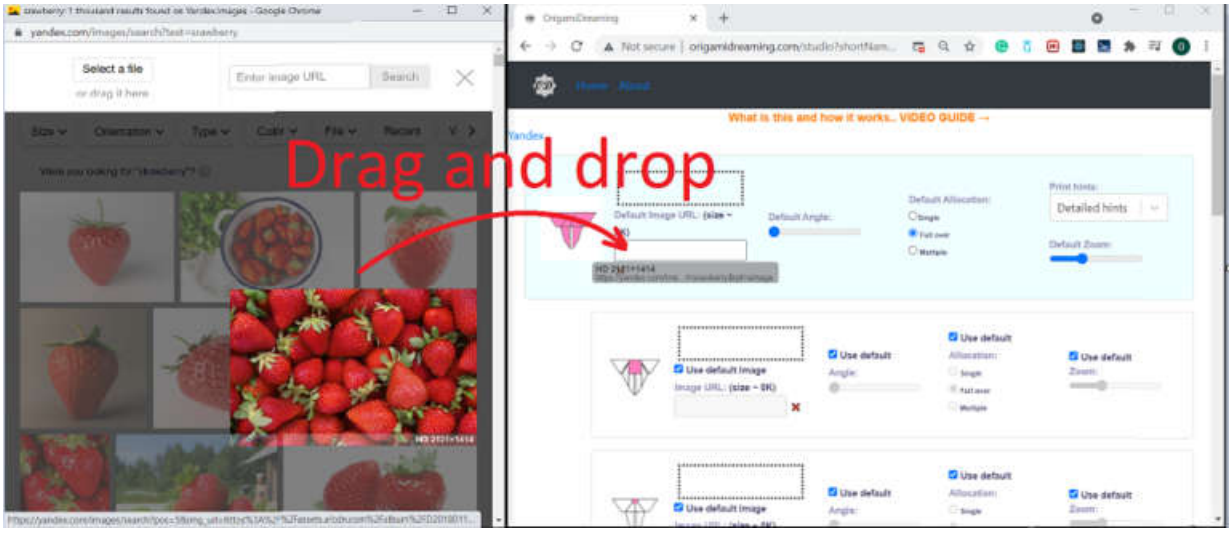
B) On the left side, we find Yandex and click.



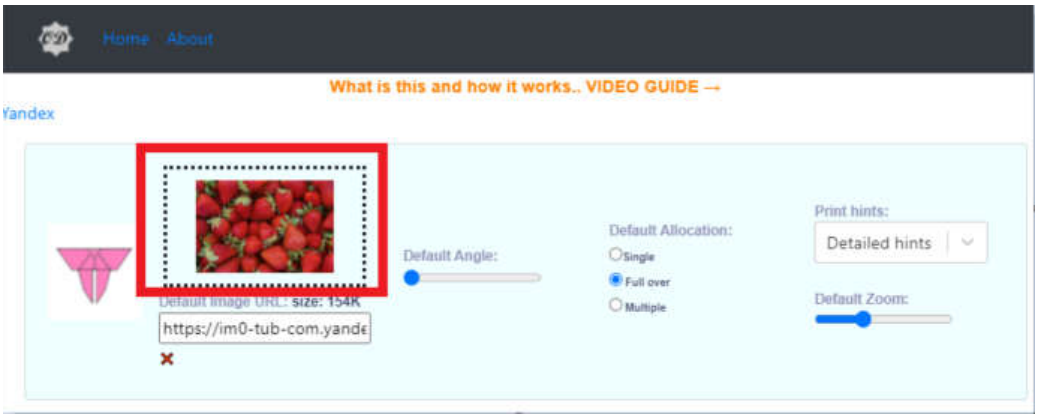
C) In the search, we find the image that you like



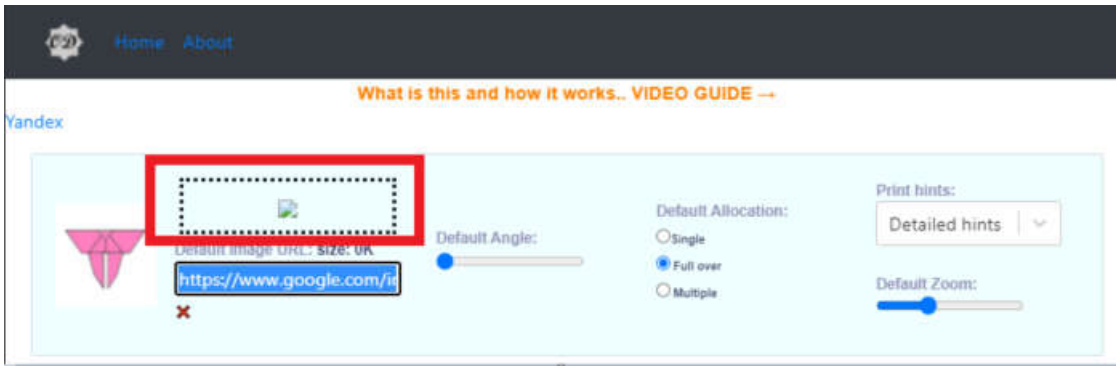
D) Drag it to the required field (standard drag and drop), don't miss :-), if necessary, select the desired options (more on that below)



Make sure the picture appears in the appropriate window

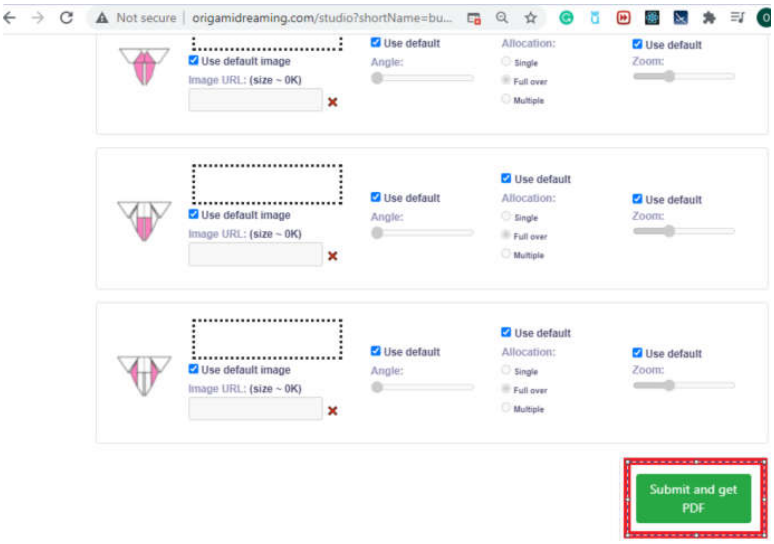


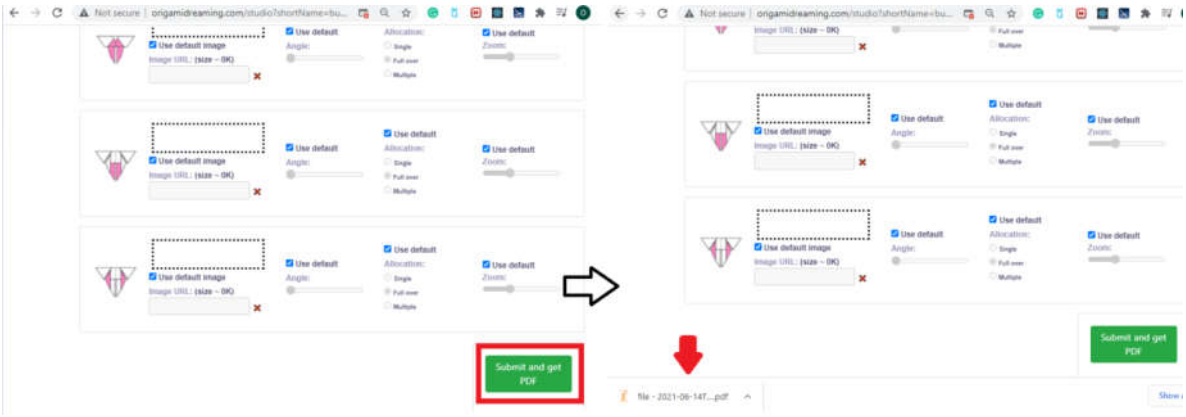
If you see something like this:



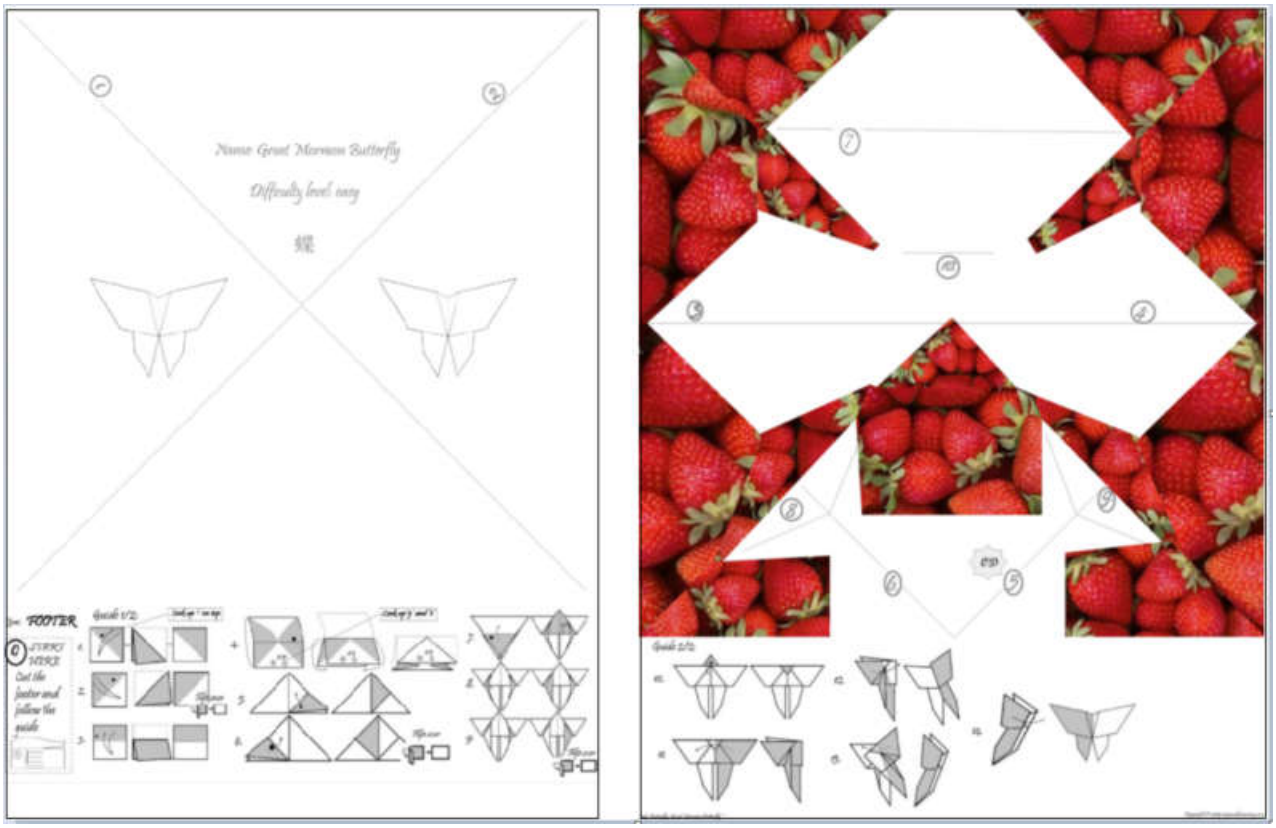
This means that this picture is blocked by third-party services and cannot be printed. This is the main reason for using Yandex and not google.
To deselect the picture, click X **(!!! Delete the picture only this way)**

E) At the bottom of the page, click the "Submit and get PDF" button and wait half a minute





Result:



As you can see, the quality of the picture with the strawberries is mediocre, and in general, the image alone looks boring.

To fix this, read on.

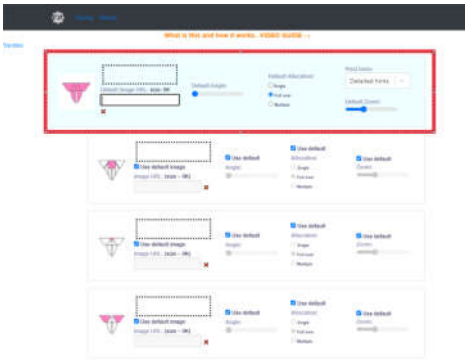
Today (summer 2021), most of the pictures on the Internet can be used for design if they are not blocked, however, I have not yet implemented the function of downloading maps from a computer, but if you really want to, you can upload your picture to facrbook.com and from there copy the link to the picture in the field. If access to the picture is open, the server will pick it up. This does not work with Instagram because pictures are blocked there.

And you will see the already familiar view:

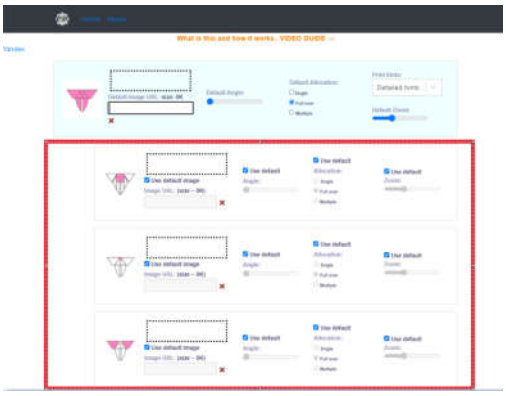
As a result, the server can generally cancel the upload of the finished PDF.
To cancel and prepare the field for a new picture, click **X,** near URL.

2.2 Studio

For simplicity, Studio has been split into 2 parts:
- Default section



- Object-by-object section



This is done for simplicity, so that newcomers can get the simplest result and make their first color origami at the first visit to the site, without going into all the possibilities of the resource. Watch the video and try to create your own simple phoenix model (If you haven't watched it yet):

https://www.youtube.com/watch?v=UCbfbHB-89I

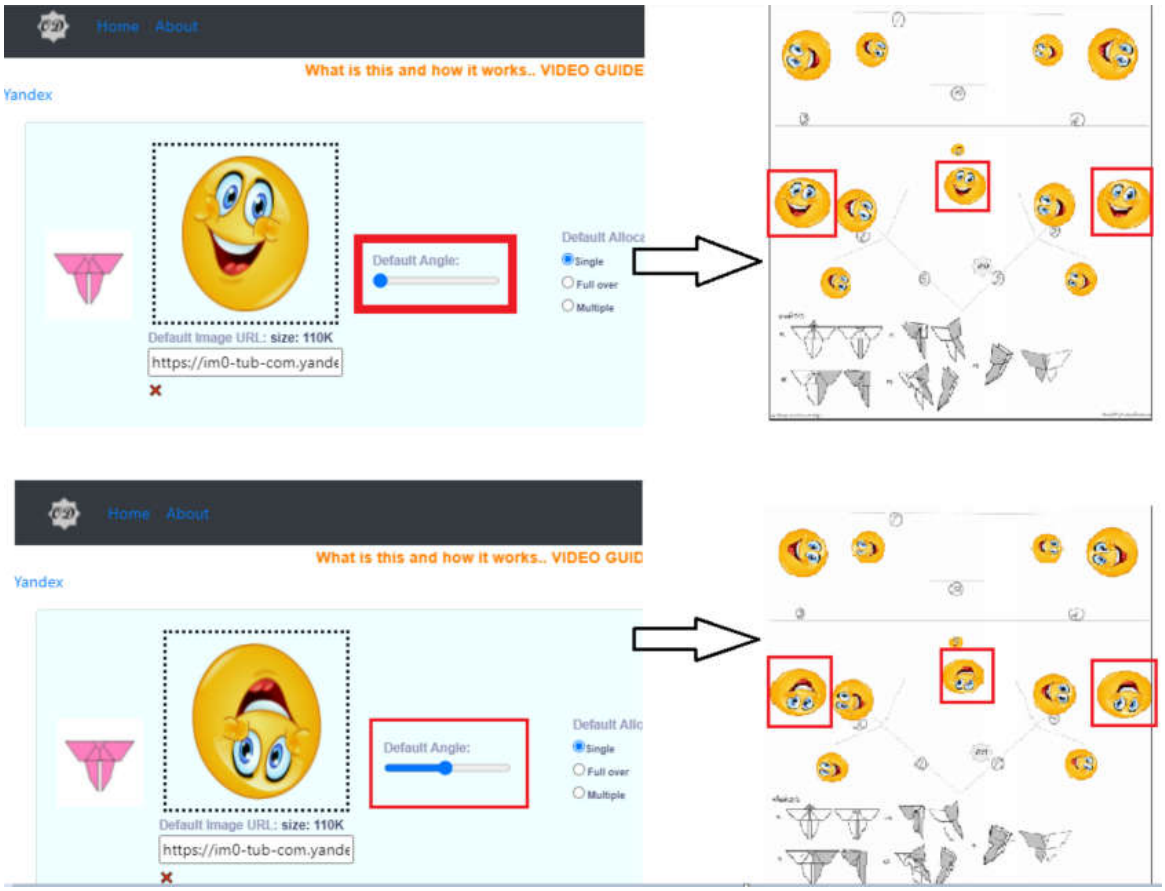
It is important that we transferred the picture to only one field, while the entire model was colored in this picture. This is what characterizes the default part.
That is, we will make all other changes on the object-by-object part, in relation to a specific

part of the model. Since there were no changes in the object-by-object part, the default value occupied the entire model.

Before moving on to the object-by-object part, let's take a look at the various tools.

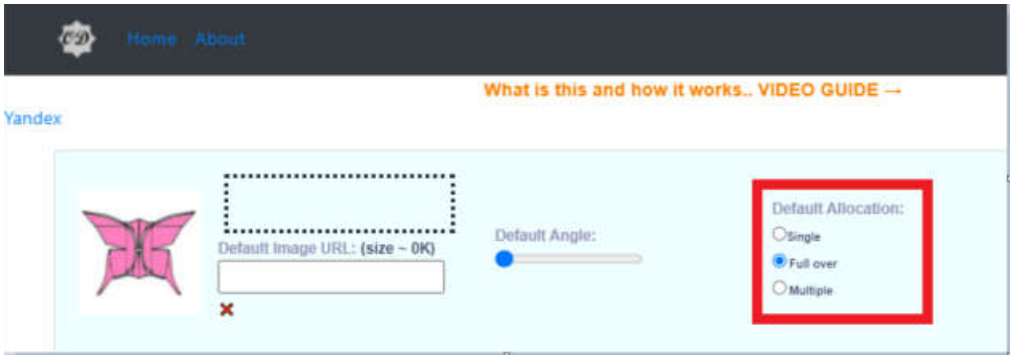
2.2.1 Angle

Now let's look at the first Angle option of the default part.
After adding the picture, move the turntable to the right, the picture will rotate. The result will be the same on the printed sheet.
Everything is simple and obvious here, I will not focus on this.

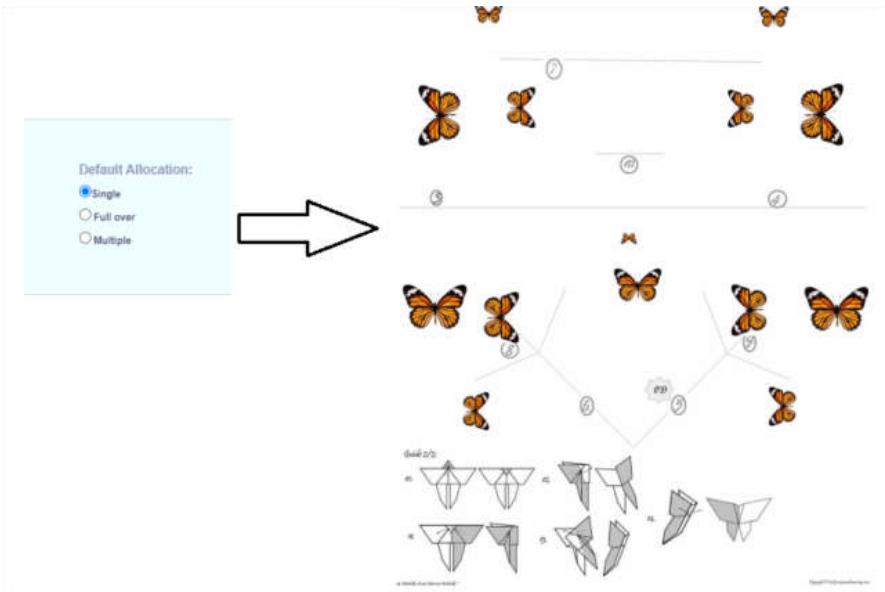


2.2.2 Allocation

The next option is Allocation.
There are three options:
A) Single
B) Full over
C) Multiple



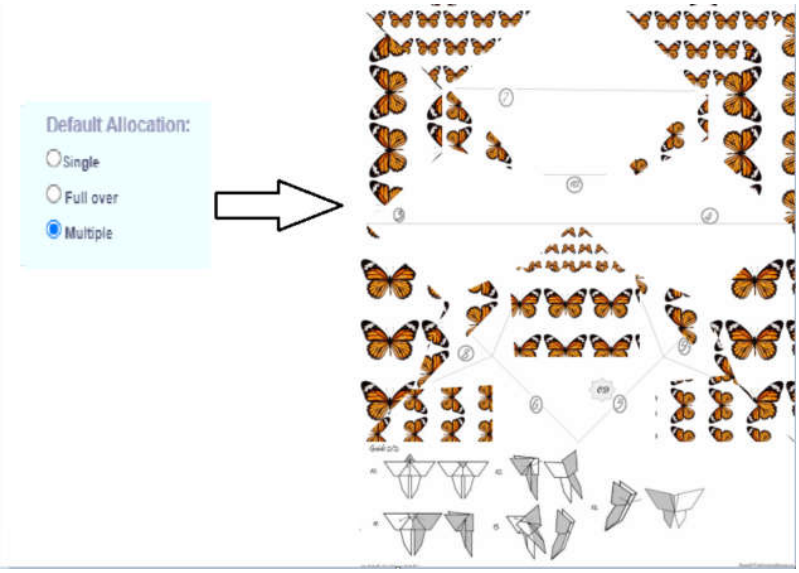
Single is the simplest option. The picture will be placed on a single copy on the specified fragment (Since we do this in the default part, one picture will be placed on each fragment). Use jpg pictures.



Full over - is a kind of background. You can choose, for example, a pattern. The image will

be stretched to fill the entire fragment.

Multiple - will multiply the picture and place it on a fragment.



2.2.3 Hints

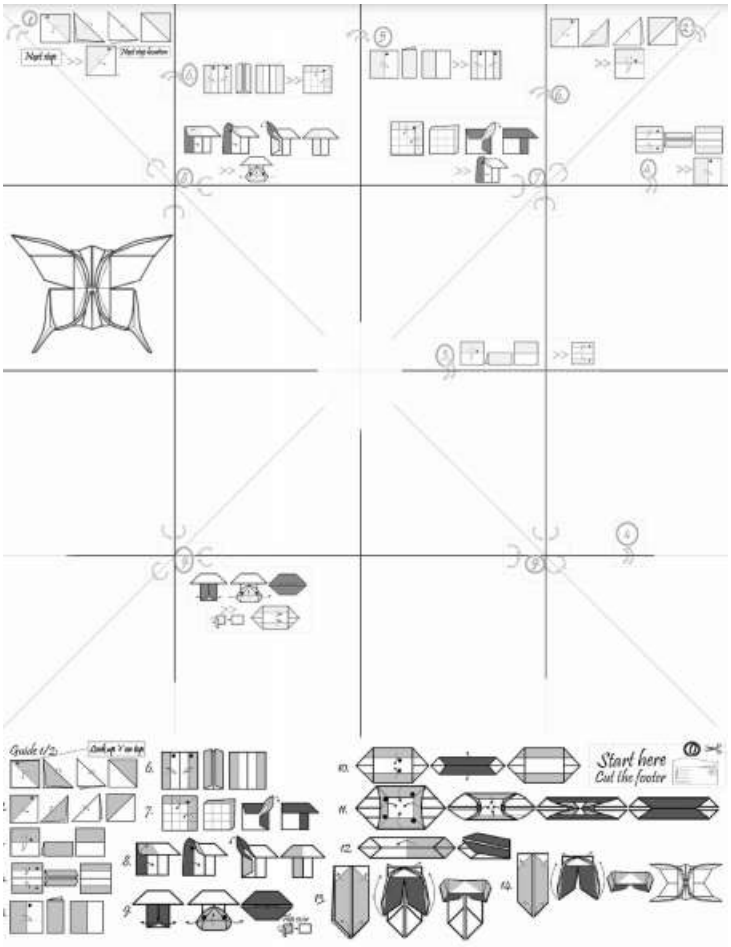
The **Print hints** option adds manufacturing hints to the paper.
There are three options:

A) None
B) Hints
C) Detailed Hints

None – when this option is selected, hints will not be added to the sheet

Hints – Only the necessary prompts will be printed

Detailed Hints — Detailed tips will be printed on the sheet.

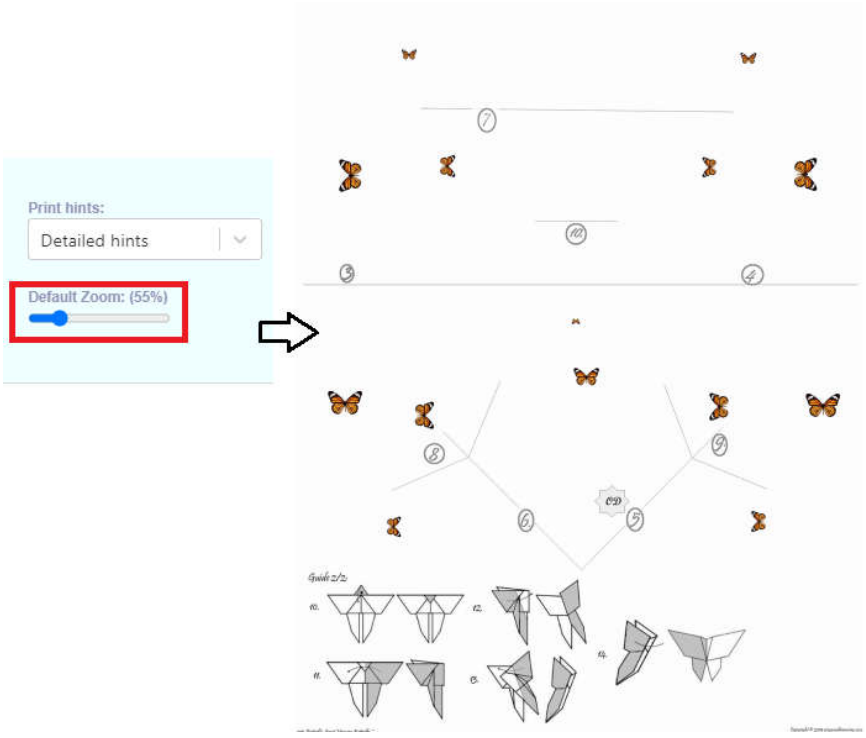


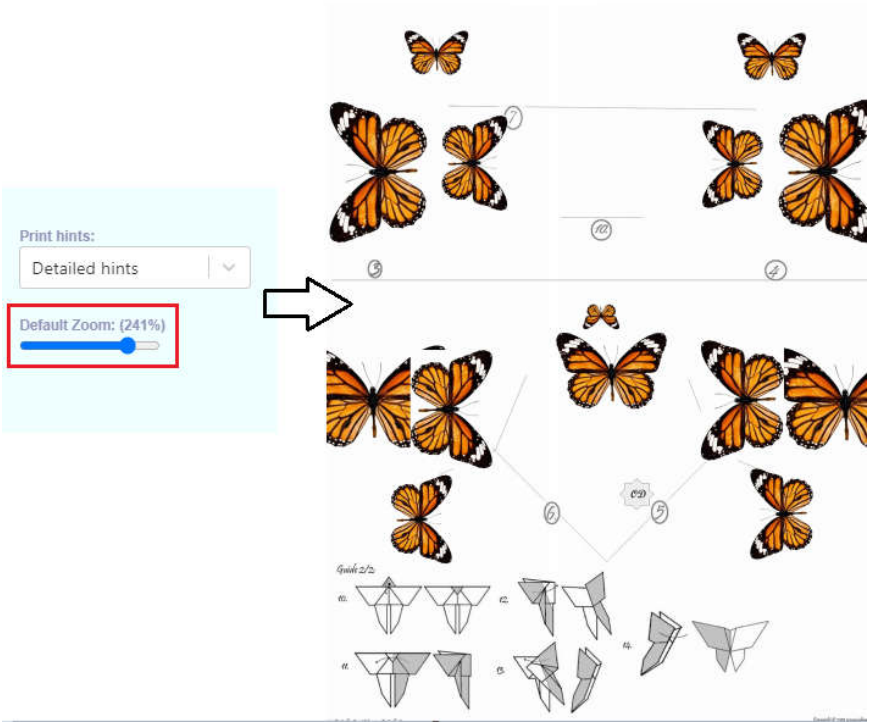
P.S. Most of the models have animation tips that can be found by clicking on the "Steps" button.

2.2.4 Zoom

Finish this block with the Zoom option.

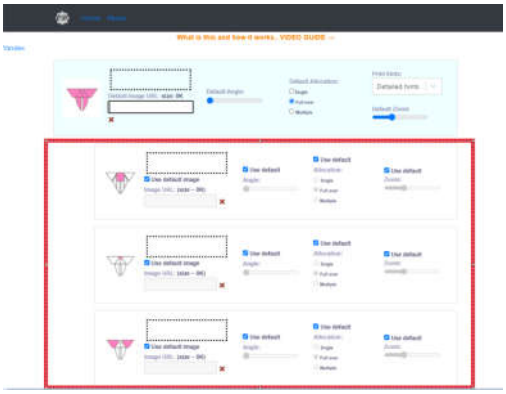
This option is active only if the Allocation option is in single or multiple mode.
You can change the size of the picture from 1 to 300 percent.


Print hints:
Detailed hints
Default Zoom: (55%)

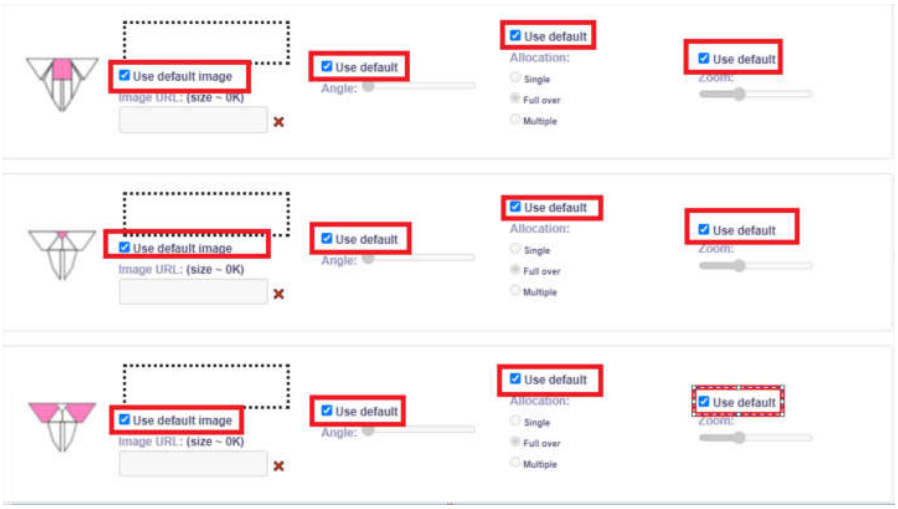

Print hints:
Detailed hints
Default Zoom: (241%)

2.3 Multiple images on one origami model

Object-by-object section.
So, now let's consider the possibility of placing different pictures on one model. For these purposes, the **Object-by-object section** has been created.

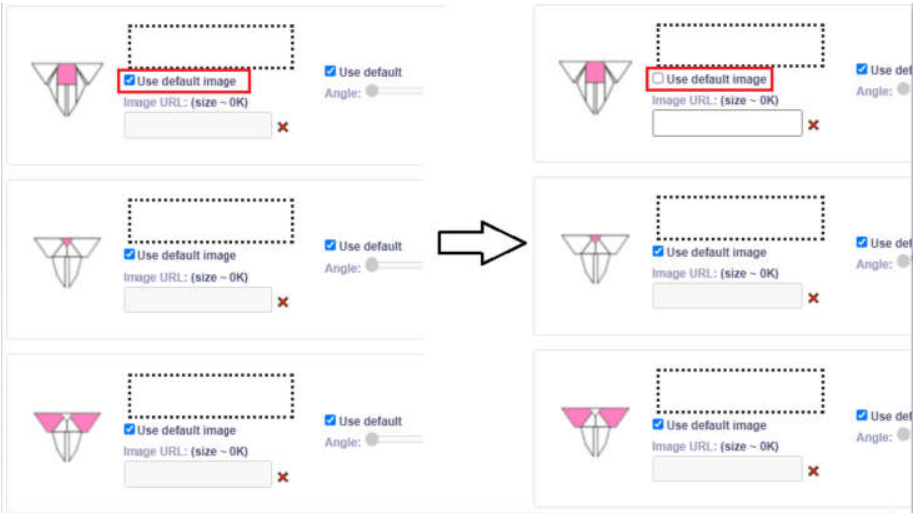


The main element here is check boxes.



In general, this means that when the checkbox is checked, this fragment will use the settings from the **default section**, which we discussed above.

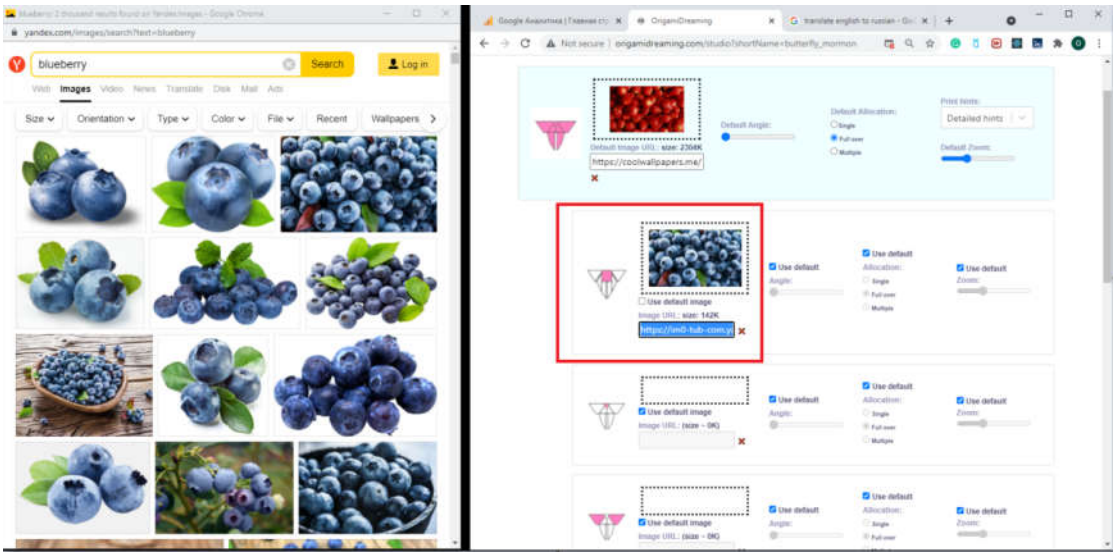
Let's try to create our butterfly with a different color on the belly. To do this ... Just uncheck the check box.



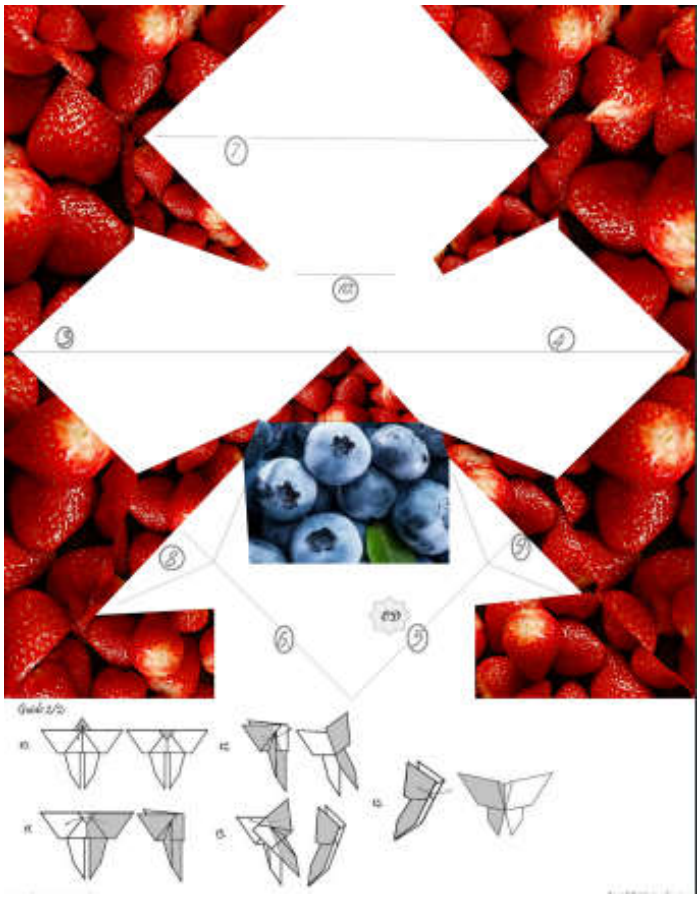
As we can see, the input field for the image immediately became active and is ready to accept the URL of the image.

Important: If you leave the released checkbox without an image, then this fragment will remain empty.

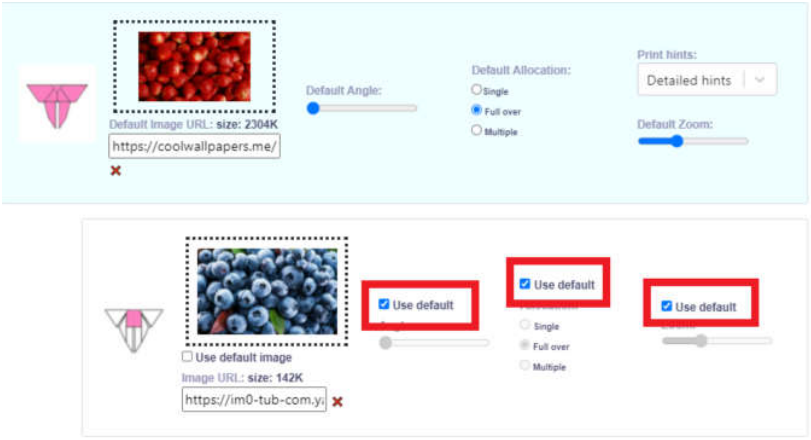
But let's add a picture there using the drag and drop method, just as we did in the default part:



And here's the result:

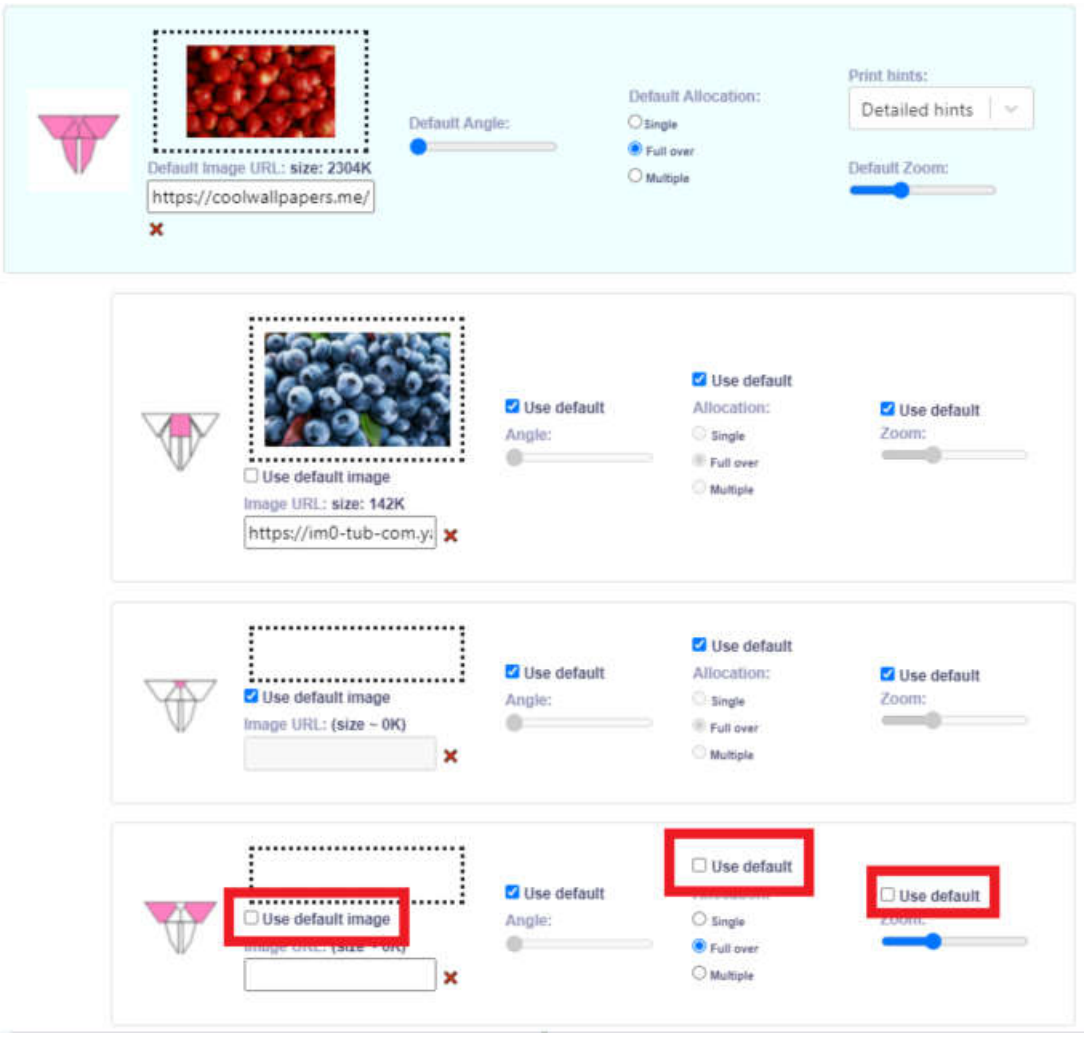


It is important to note the following:
The rest of the checkboxes of this fragment remained checked,

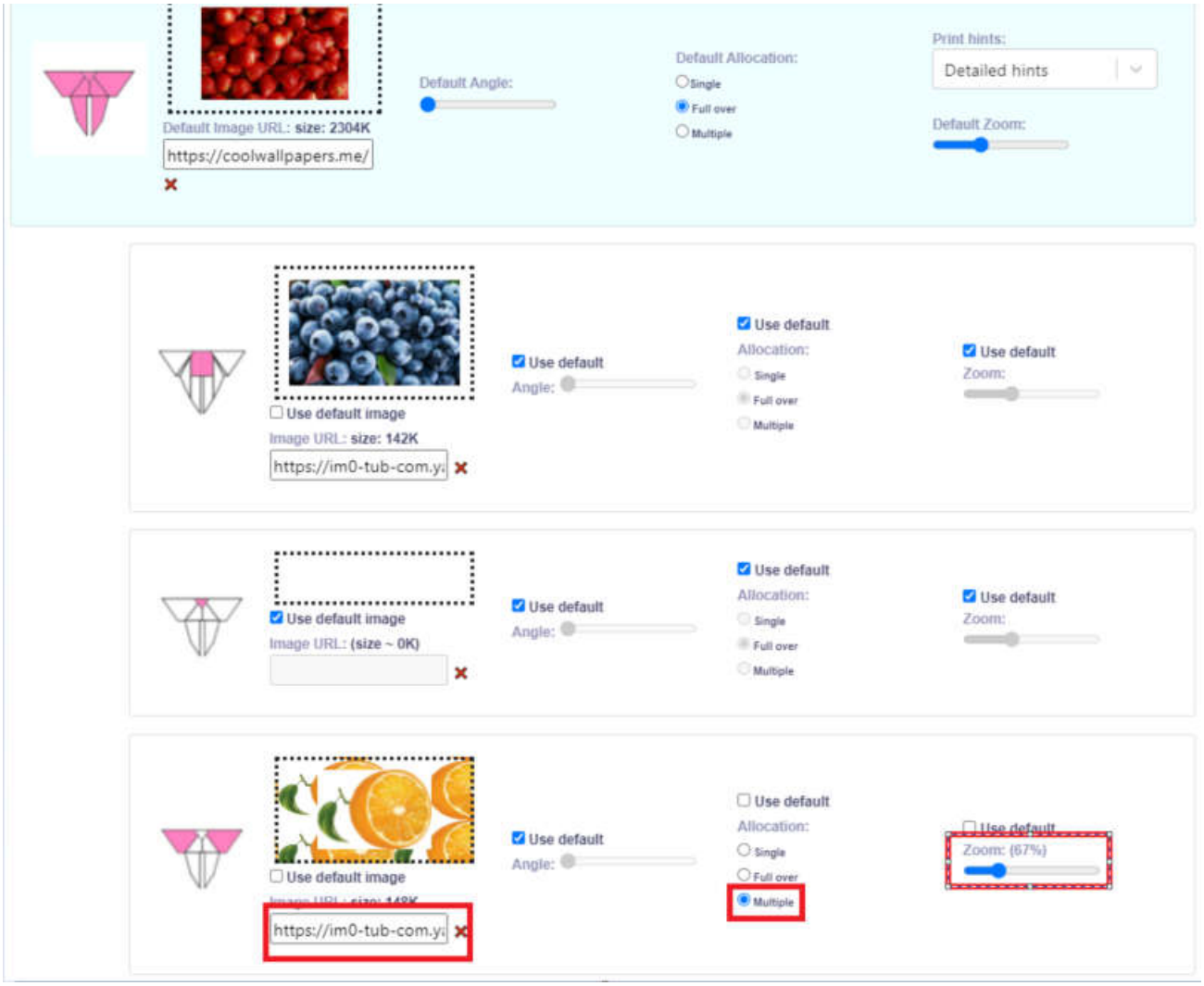


Therefore, the Angle, Allocation and Zoom parameters for the new image were taken from the default section. That is, if we rotated the default image 180 degrees, the new image would also be rotated.

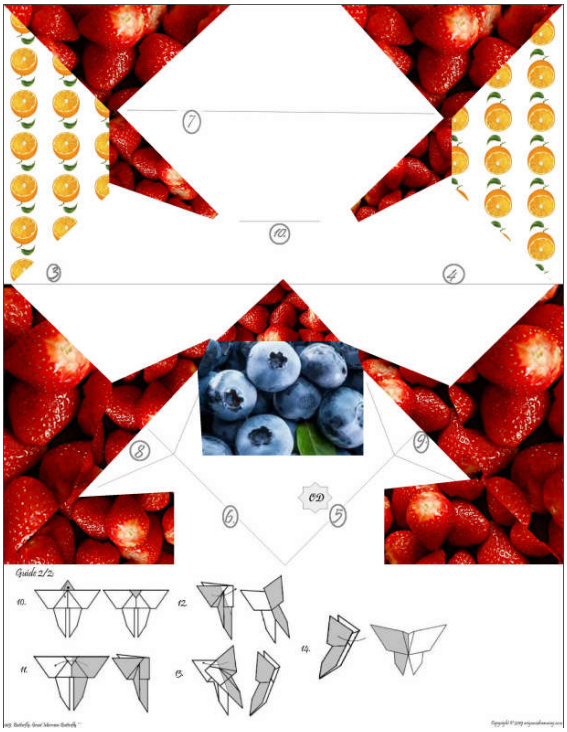
Now let's try to personalize the fragment and place the orange on the butterfly's wings and increase the zoom. To do this... Press the corresponding checkboxes to be unchecked:



Add the URL of the image (using the drag and drop method as we did before) and set the appropriate parameters:



And here's the result:



And this is how it will look in the final:

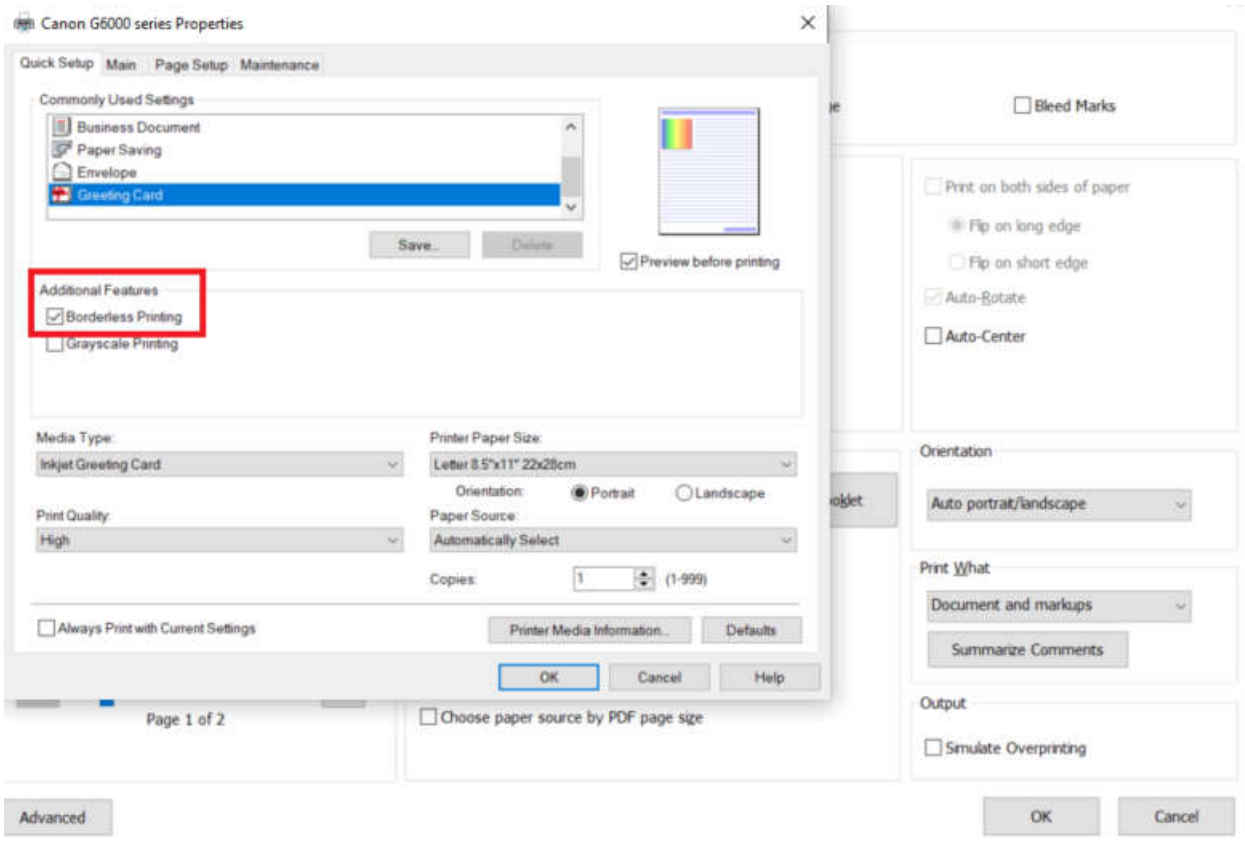
These are all the main features of **Studio** and we can move on to the next topic.

3. Printing the model on a printer

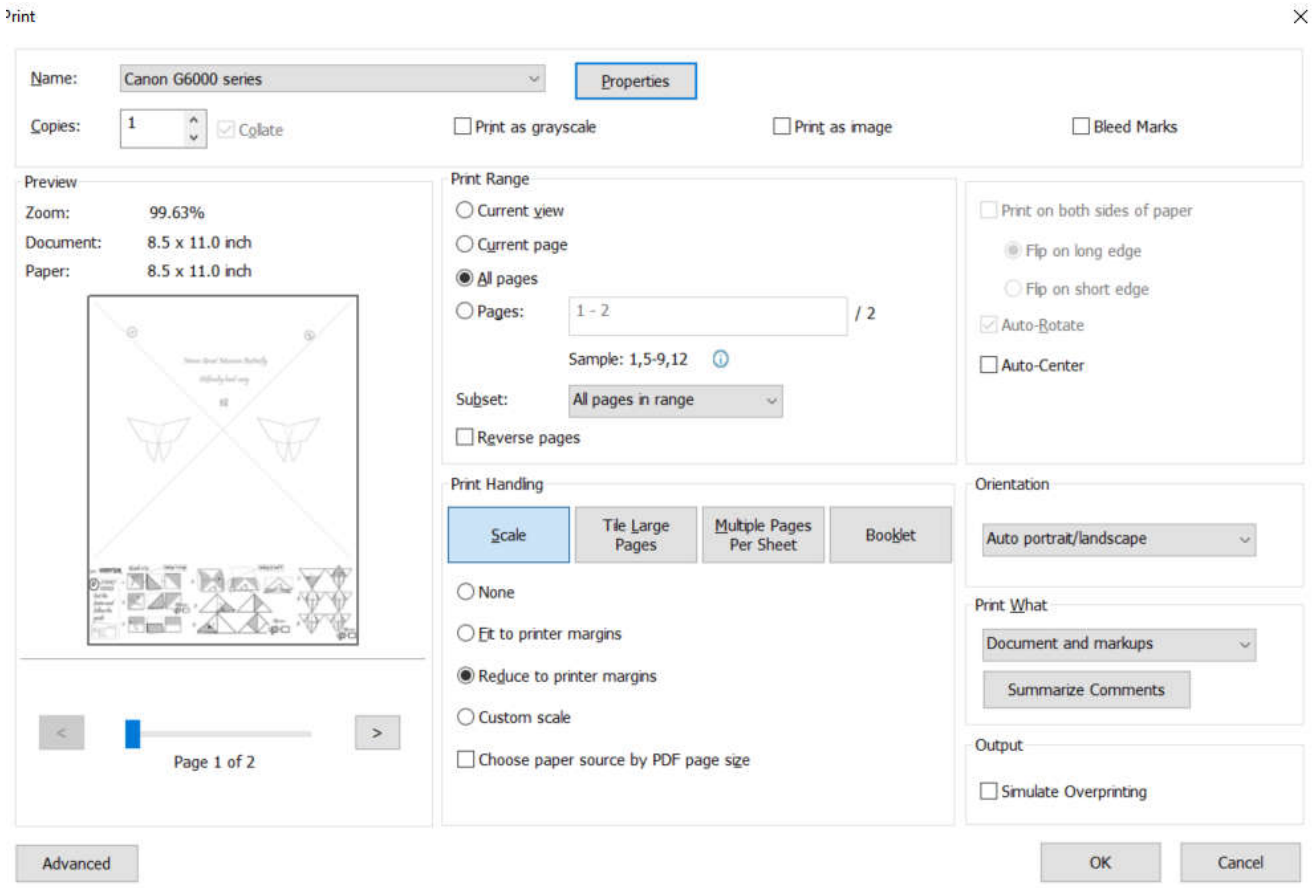
This is the hardest part of the whole process, which I have never been able to simplify. There are several reasons for this: The main one is the supply of paper for printing. But more on that later, and now I'll show you how I print:

First of all, make sure your printer can print in borderless mode. Most printers have this mode, but not all. It allows you to print on the page without margins.

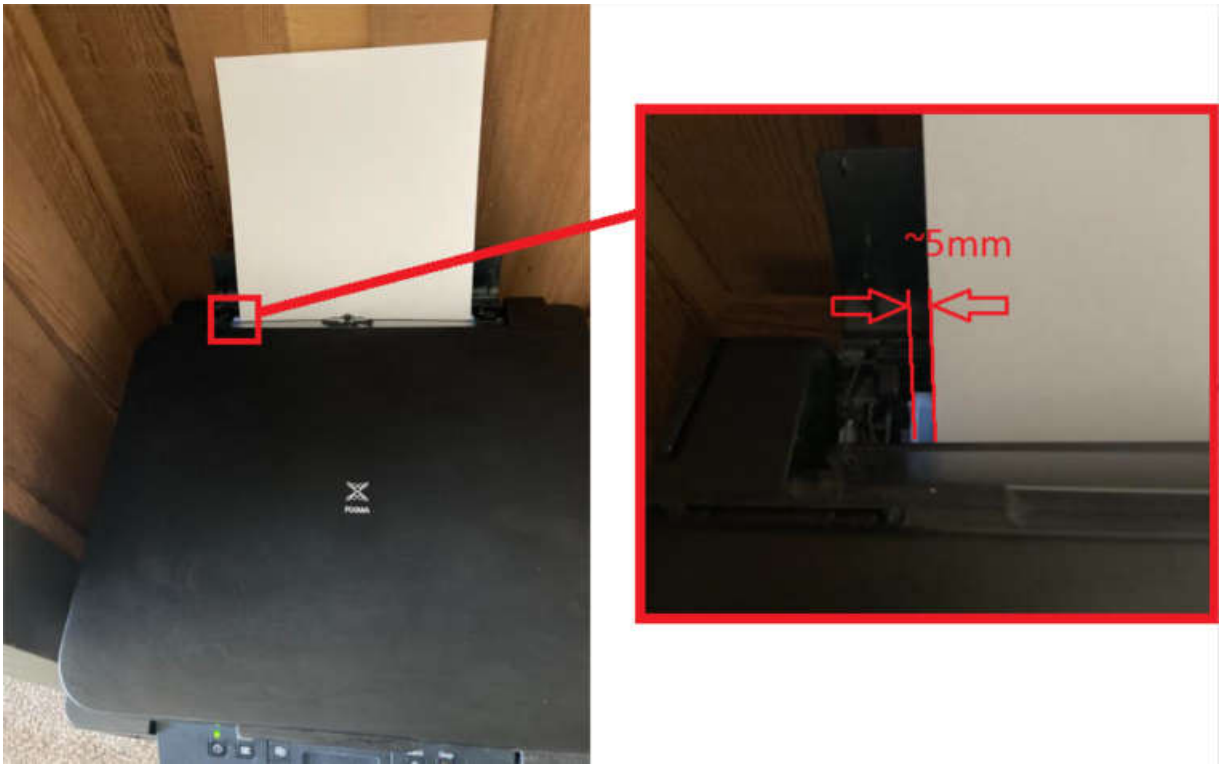
To make sure it is available and To do this, go to the settings, for me it looks like this:



Also, the rest of the settings are listed below.



Important!!! You may need other settings. This is the main difficulty.
In addition, the indent when loading paper is important:



This indentation can create a white streak on the printout.

I recommend creating a model without pictures, but with tips and practice on it with printing on different modes. This will preserve the colored paint.

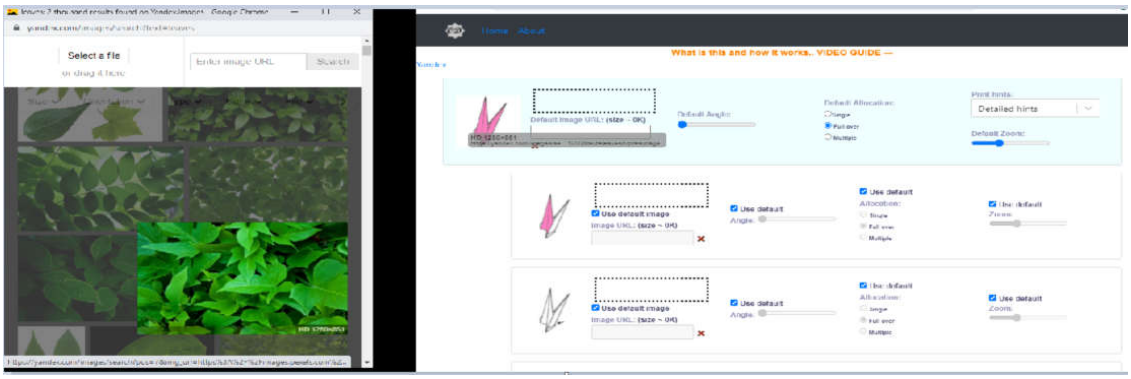
4. Image resolution (length and height)

Before starting this section, I want to explain the reasons why I am not fixing some of the existing bugs and limitations.
At the moment, this http://origamidreaming.com does not bring me any profit, moreover, I pay for the work of the servers on a monthly basis. To reduce these costs, I optimized the program so that it could be executed even on a weak server and, accordingly, I use them. For this reason, there are a number of restrictions on the size of individual images and the total file size.

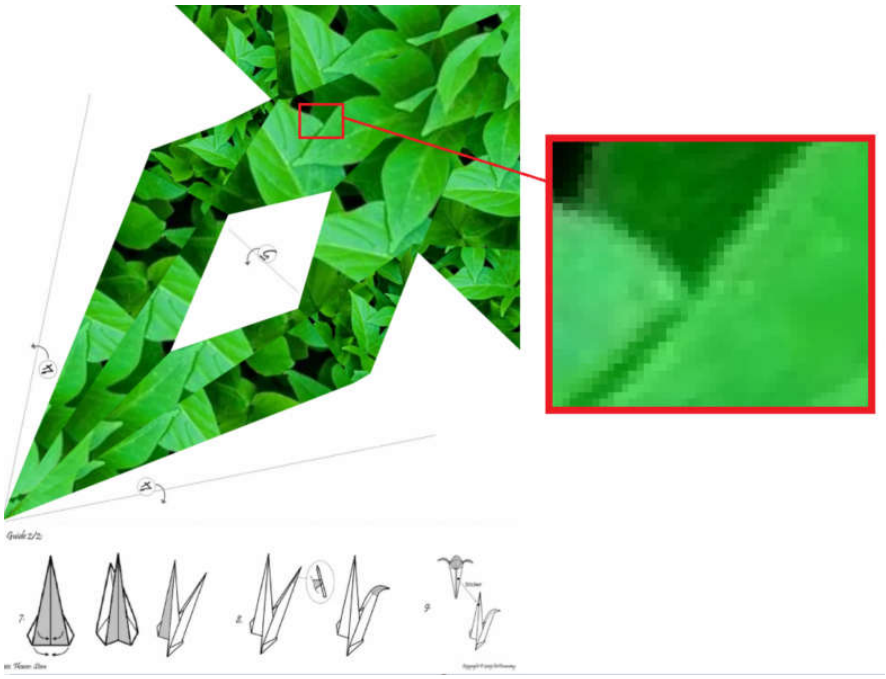
So, working with images is a very heavy operation for computing devices. When your images are overlaid on PDF, almost all the power of the dedicated machine goes to this operation. The server will not pull two such operations, so each request is processed sequentially one by one.
For this reason, you have to wait up to two minutes for PDF downloads.
At the moment, I have two such servers, between which the load is divided automatically, but this may still not be enough with an increase in the number of users.

Now about the resolution of images

Итак давайте создадим модель, Stem уже известным нам способом:

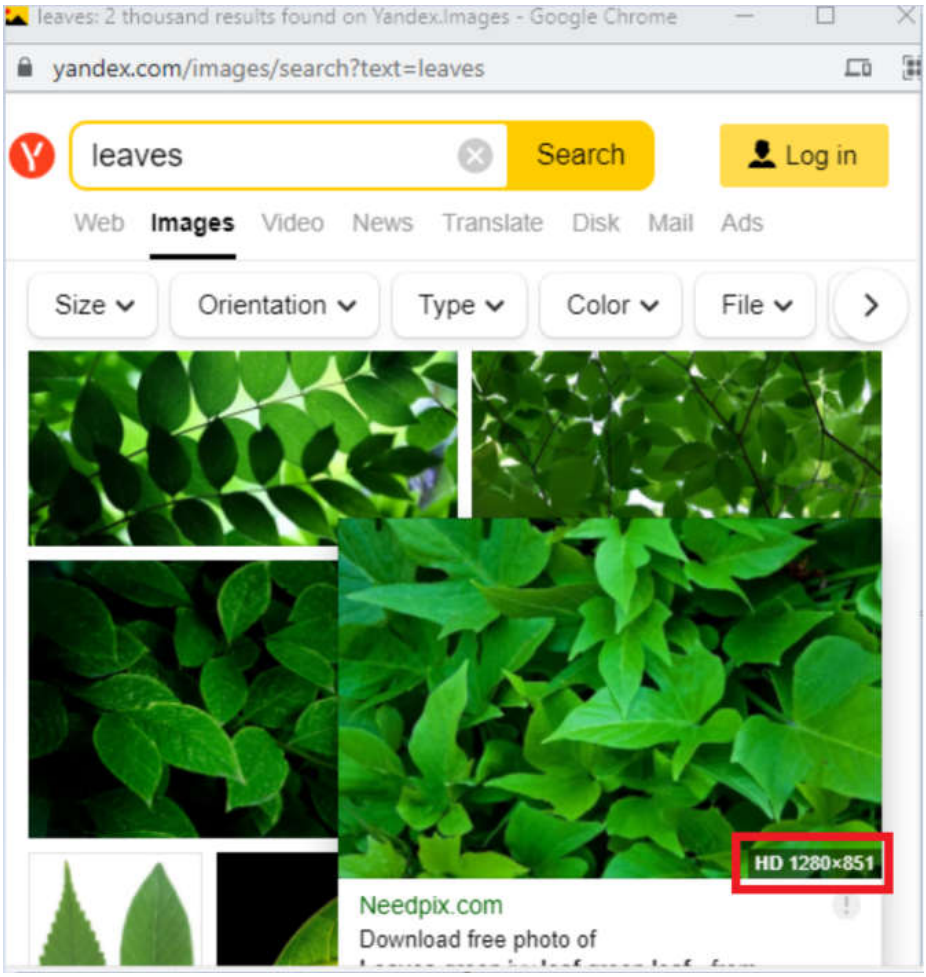


And here's the result. If you look closely, you can see that the picture is very grainy, sometimes, it will be visible on the printout:



If the fragment is small or the full over mode is not used, then this is not visible, otherwise the grain may be visible.
However, if you require quality it is better than what it is. Let's see how to improve it.

First of all, when opening a third-party Yandex address, we see a list of images that the search engine returned, pay attention to the numbers:

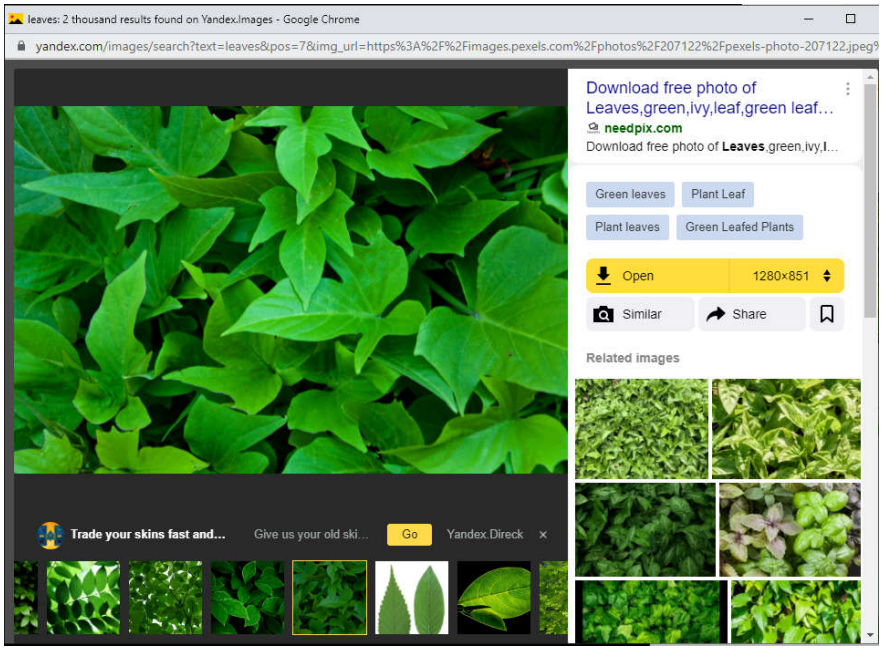


This resolution of the original image is 1280 X 851 pixels.
But this page does not display the original, but a preview of the image, this is done to reduce the loading time.
Let's drag this image and post its relative size:

153K is the approximate size of the preview image in Kilobytes with which the server will work.

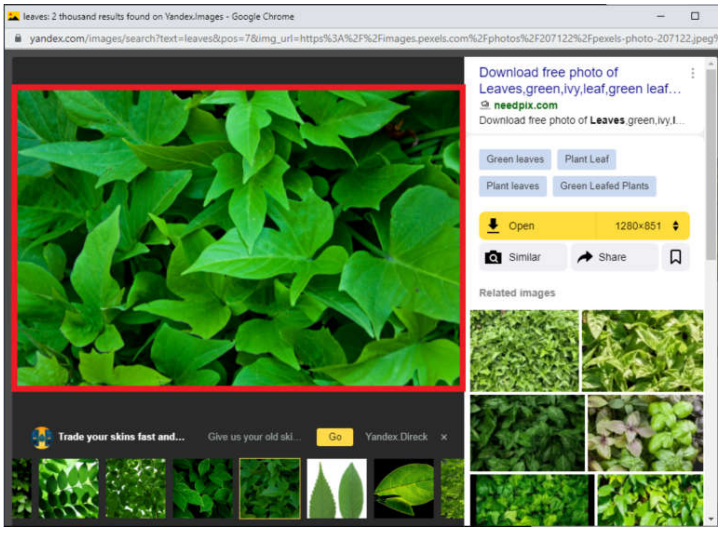
To improve the quality, you need to drag the original image into the field, not the preview.

To do this, simply click on it and see something like this:



If the required field in Studio is occupied by the previous image, then click X to delete the previous image and prepare the field for the new one.

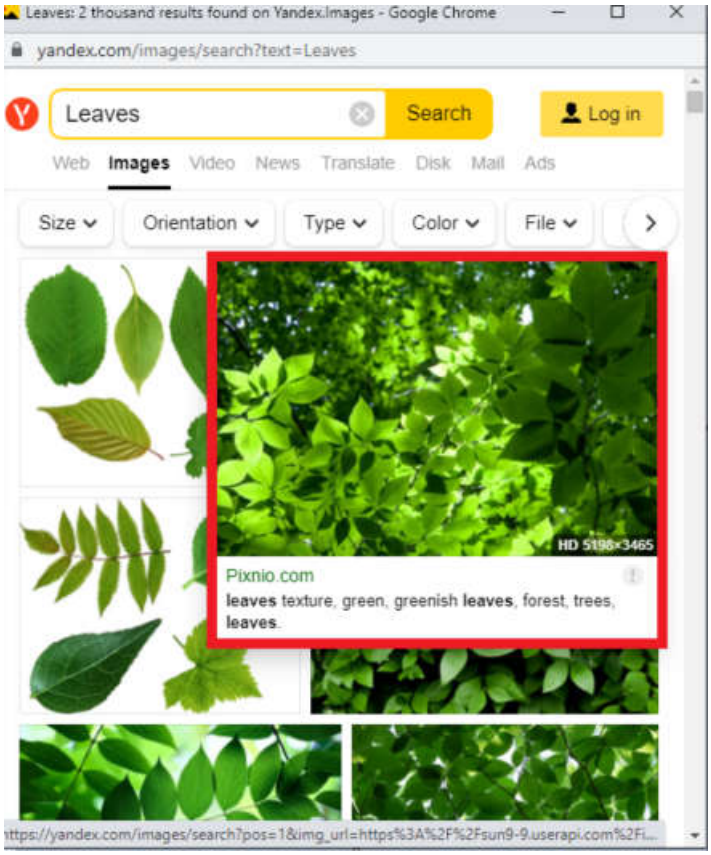
Our task is to drag and drop a big picture:



As you can see, the size has become significantly larger.

Now let's take a look at some of the problems you may encounter:

Let's load the **original** of this image:

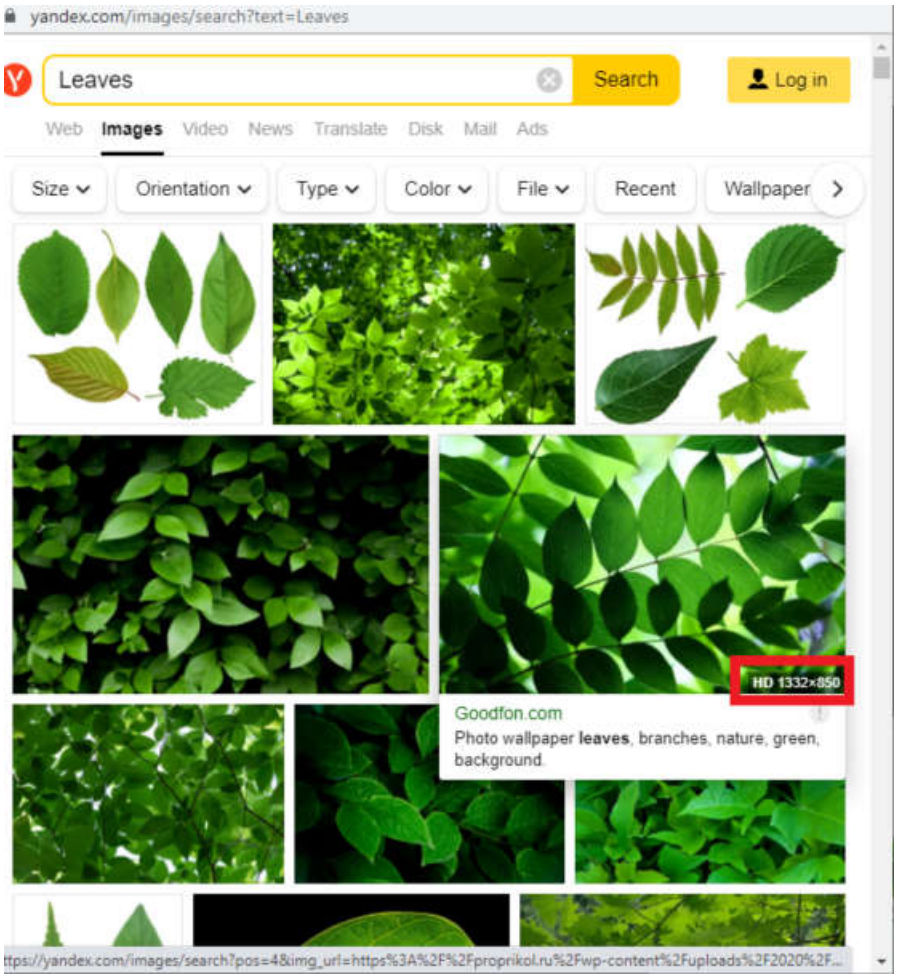


To do this, click on it and drag and drop into the appropriate field and here is the result:

The original of this image has a huge resolution of 5198 X 3465 each of these values should not exceed 2300 pixels. At the same time, in the preview mode, you can easily add it, but with a low resolution and, accordingly, quality.

I set this limitation artificially so that the server would work stably.

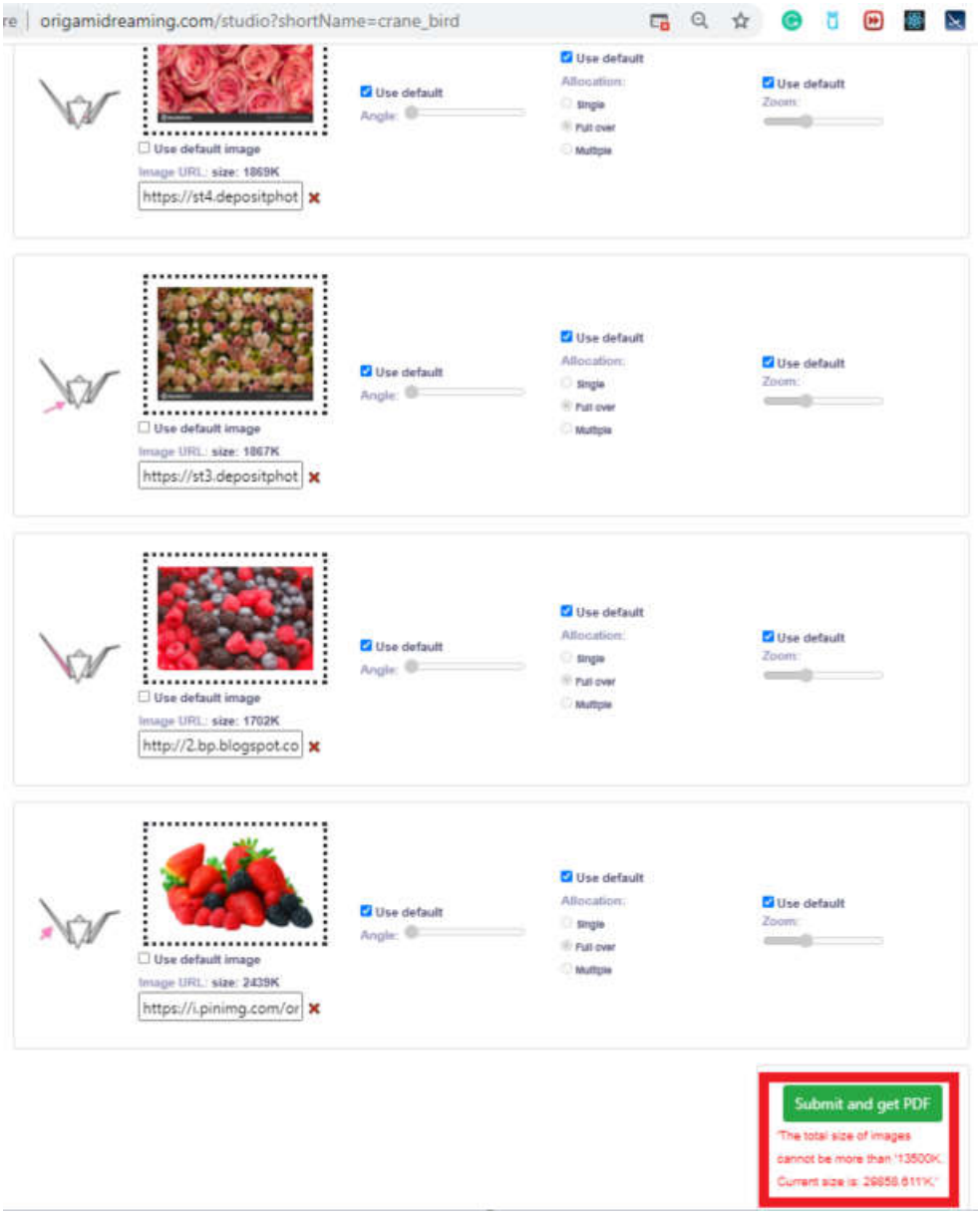
To prevent this from happening, select originals of images smaller than the specified sizes. You can see them on the preview:



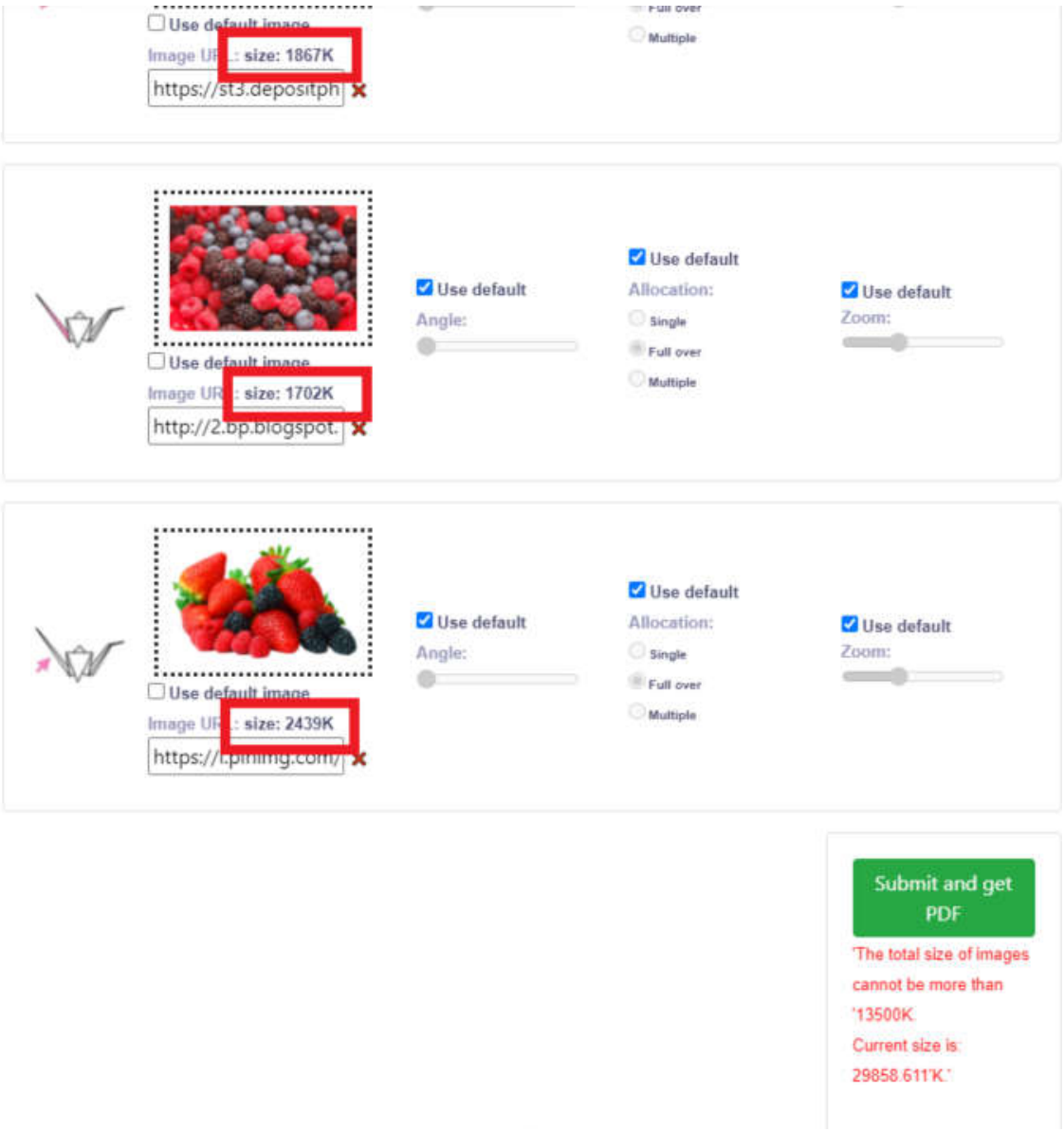
I emphasize once again that in preview mode, this image can be easily processed, since it

has a low resolution

The second limitation applies to the total size of the selected picture of the picture. This problem occurs when the detailed model is in use. Let's take the Crane example and add many different **originals** to it. As we already know, the size of the originals is larger than the size of the preview:

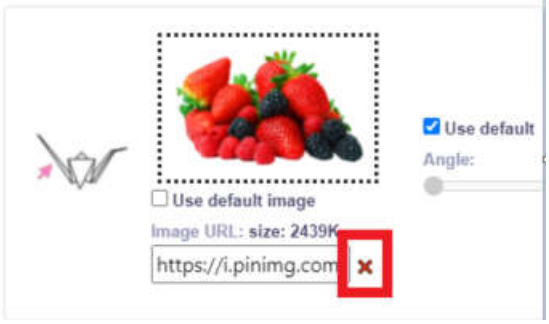


Now pay attention to the size of the images we are loading:



To solve this problem, just replace some of the images with smaller ones or with preview

Attention, the removal of the image is ALWAYS carried out through X



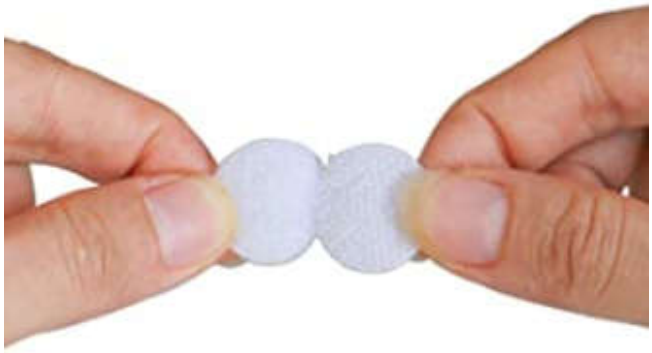
5 Additional features

Now let's talk a little about additional features that are not entirely obvious.

1. Is it possible to superimpose two or more images on a picture?

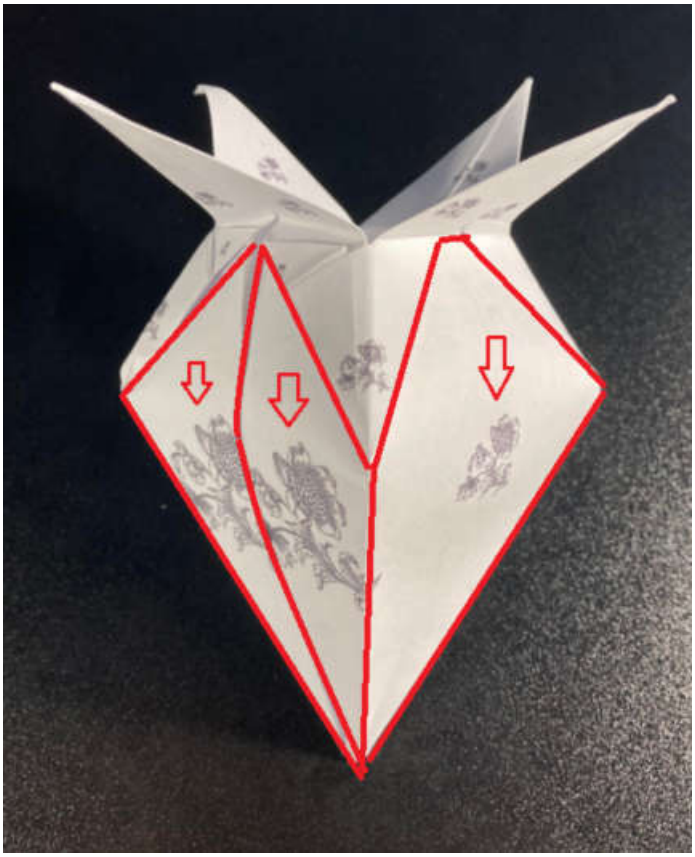
Yes you can. For these purposes, we first set and print a background image. Then, create another design and print it on the same sheet. The images will be superimposed on the final model.

2. Use stickers, Velcro, adhesive magnets on your models, this will allow you to secure them.



6 Some remarks

So, the algorithm for placing single images includes reducing the image to the size of a fragment. In the model "Flower: campanula" this operation is performed with an error, it is possible to work, but it looks worse aesthetically than in others.



As you can see, the images on the large fragment are small, and on the small fragments they are large. These fragments belong to the same group, therefore, you cannot change by zooming one of them without touching the other.
I don’t know how to fix it so as not to hurt other models.

Well, that's all I wanted to tell you about.

Good luck to all, Dmitry.